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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/580,394

05/22/2006

Kyung Sang Cho

PHO0024US

1954

23413 7590 07/23/2009
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EXAMINER

BREVAL, ELMITO

ART UNIT

PAPER NUMBER

2889

NOTIFICATION DATE

DELIVERY MODE

07/23/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptopatentmail@cantorcolburn.com

Office Action Summary	Application No.	Applicant(s)	
	10/580,394	CHO ET AL.	
	Examiner	Art Unit	
	ELMITO BREVAL	2889	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/08/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2 are rejected under 35 U.S.C. 102(e) as being anticipated by Jain et al., (US. Pat: 6,797,412) of record by the applicant.

Regarding claim 1, Jain ('412) teaches (in at least figs. 6, 8 and 9; and corresponding lines and columns) a quantum dot light-emitting device comprising a pair of top and bottom electrodes (27, 29; i.e. anode and cathode) and a quantum dot light emitting layer (15) provided between the electrodes wherein an inorganic dielectric layer (28; i.e. the electron transport layer) is formed between the quantum dot light emitting layer (15) and the top electrode (29).

Regarding claim 2, Jain ('412) teaches (in at least fig. 6) the quantum light emitting device comprises an anode (27), a hole transport layer (28; i.e. the dielectric layer), a quantum dot light-emitting layer (15), an inorganic electron transport layer (28; i.e. the other dielectric layer) and a cathode (29) formed in this order on a substrate (26).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bulovic et al., (US. Pub: 2004/0023010) of record by the applicant in view of Kishigami (JP: 2000-215984) of record by the applicant. The examiner is using the machine generated English translation of the foreign reference.

Regarding claim 1, Bulovic ('010) teaches (in at least figs. 1 and 2) a quantum dot light emitting device comprising a pair of top and bottom electrodes (2, 5; [0027]) and a quantum dot light emitting layer (not shown in fig. 1; [0027]; see fig. 2) and electron transport layer (4; [0027]) is formed between the quantum dot light emitting layer and the top electrode (5).

However, Bulovic ('010) fails to expressly disclose an inorganic electron transport layer.

Further regarding claim 1, Kishigami ('984) teaches (abstract) a light emitting device comprised of, in part, a luminescent layer (4) and an electron transport layer (3) that contains an n-type inorganic compound semiconductor for the purpose of having a device capable of continuously and stably emitting light for a long time with a high luminance.

Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made to contemplate of using the inorganic electron transport layer of

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Kishigami in place of the organic electron transport layer of Bulovic for the purpose of having a device capable of continuously and stably emitting light for a long time with a high luminance.

Regarding claim 2, Bulovic/Kishigami teach the diode comprises an anode, a hole transport layer, a quantum dot light emitting-layer, an inorganic electron transport layer and a cathode formed in this order on a substrate.

Regarding claim 3, Kishigami ('984) teaches (in [0028]) the inorganic electron material is selected from CdS, ZnO. The reason for combining is the same as for claim 1.

Regarding claim 4, Bulovic ('010) teaches (in paragraph [0031]) the quantum dot light-emitting layer is made of a material such as CdSe.

Regarding claim 5, Bulovic/Kishigami teach the inorganic electron transport layer (of Kishigami) can be formed by spin coating, vapor deposition ([0030] of Bulovic).

Regarding claim 6, Bulovic ('010) teaches (in paragraph [0029]) the hole transport layer is made of TPD.

Regarding claim 7, Kishigami ('984) teaches (in [0028]) the inorganic electron material is selected from CdS, ZnO. The reason for combining is the same as for claim 1.

Regarding claim 8, Bulovic ('010) teaches (in paragraph [0031]) the quantum dot light-emitting layer is made of a material such as CdSe.

Regarding claim 9, Bulovic/Kishigami teach the inorganic electron transport layer (of Kishigami) can be formed by spin coating, vapor deposition ([0030] of Bulovic).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELMITO BREVAL whose telephone number is (571)270-3099. The examiner can normally be reached on M-F (8:30 AM-5:00 Pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Toan Ton can be reached on (571)-272-2303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

July 16, 2009
/Elmito Breval/
Examiner, Art Unit 2889
/Joseph L. Williams/
Primary Examiner, Art Unit 2889